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New York State
College of Agriculture

Announcement of Courses in

Wild-Life Conservation and Management

for 1935-36

Ithaca, New York
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July 15, 1935

THE CALENDAR FOR 1935–36

First Term

	1935	
Sept. 23	Monday	Academic year begins. Registration of new students.
Sept. 24	Tuesday	Registration of old students.
Sept. 25	Wednesday	
Sept. 26	Thurs. 8 a.m.	Instruction begins.
Oct. 18	Friday	Last day for payment of tuition.
Nov. 28–Dec. 1		Thanksgiving recess.
Dec. 21	Sat. 12.50 p.m.	Instruction ends — Christmas recess.
	1936	
Jan. 6	Mon. 8 a.m.	Instruction resumed. — Christmas recess.
Jan. 11	Saturday	Birthday of Ezra Cornell. Founder's Day.
Jan. 27	Monday	Term examinations begin.

Second Term

Feb. 7	Friday	Registration of all students.
Feb. 8	Saturday	
Feb. 10	Mon. 8 a.m.	Instruction begins.
Mar. 2	Monday	Last day for payment of second-term tuition.
Mar. 28	Sat. 12.50 p.m.	Instruction ends. — Spring recess.
Apr. 6	Mon. 8 a.m.	Instruction resumed. — Spring recess.
May —	Saturday	Spring Day, recess.
June 1	Monday	Term examinations begin.
June 15	Monday	Sixty-eighth Annual Commencement.

Correspondence

Correspondence concerning admission and the adjustment of credentials should be addressed to the Director of Admissions, Cornell University, Ithaca, New York.

Correspondence concerning the content of the instruction in Wild-Life Conservation and Management should be addressed to Professor A. A. Allen, Cornell University, Ithaca, New York.

Correspondence regarding all other questions relating to the courses should be addressed to the Secretary of the College of Agriculture, Roberts Hall, Ithaca, New York.

COURSES IN WILD-LIFE CONSERVATION AND MANAGEMENT

STAFF OF ADMINISTRATION

Livingston Farrand, A.B., M.D., L.H.D., LL.D., President of the University.
Albert Russell Mann, A.M., D.Sc., D.Agr., LL.D., Provost of the University.
Carl Edwin Ladd, Ph.D., Dean of the College of Agriculture and Director of Experiment Stations.
Cornelius Betten, Ph.D., D.Sc., Director of Resident Instruction and Dean of the University Faculty.
Lloyd R. Simons, B.S., Director of Extension and Professor in Extension Service.
Olin Whitney Smith, B.S., Secretary.
Anson Wright Gibson, M.S., Assistant Professor in Personnel Administration, in charge of Former Student Relations, Vocational Guidance, and Placement.
Willard Waldo Ellis, A.B., LL.B., Librarian.
George Wilson Parker, Bursar.

STAFF OF INSTRUCTION

This list includes only those members of the instructing staff who are engaged in giving courses regularly taken by students of Wild-Life Conservation and Management.

Bristow Adams, B.A., Professor in Extension Service, Editor, and Chief of Publications.
Arthur Augustus Allen, Ph.D., Professor of Ornithology and Ornithologist in the Experiment Station.
Harry Oliver Buckman, Ph.D., Professor of Soil Technology.
Robert Theodore Clausen, A.B., Assistant in Botany.
Arthur Louis Brody, B.S., Assistant in Entomology.
Ernest Dorsey, Ph.D., Instructor in Plant Breeding and Assistant in Plant Breeding in the Experiment Station.
George Charles Embody, Ph.D., Sc.D., Professor of Aquiculture and Aquiculturist in the Experiment Station.
Allan Cameron Fraser, Ph.D., Professor of Plant Breeding and Geneticist in the Experiment Station.
Cedric Hay Guise, B.S., M.F., Professor of Forest Management.
Goldan Orlando Hall, Ph.D., Assistant Professor of Poultry Husbandry and Assistant Poultry Husbandman in the Experiment Station.*
William John Hamilton, jr., Ph.D., Instructor in Zoology.
Gustave Frederick Heuser, Ph.D., Professor of Poultry Husbandry and Poultry Husbandman in the Experiment Station.
Ralph Sheldon Hosmer, B.A.S., M.F., Professor of Forestry.
Frederick Bruce Hutt, Ph.D., Professor of Poultry Husbandry and Animal Genetics and Poultry Husbandman and Animal Geneticist in the Experiment Station.
Peter Paul Kellogg, B.S., Instructor in Ornithology.
Welford Forrest Lamoreux, B.Sc., Instructor in Poultry Husbandry and Assistant in Poultry Husbandry in the Experiment Station (second term).
Richard August Laubengayer, Ph.D., Instructor in Botany and Assistant in Botany in the Experiment Station.
Clive Maine McCay, Ph.D., Professor of Animal Nutrition and Animal Nutritionist in the Experiment Station.
John Clarence McCurdy, B.S., C.E., Professor of Agricultural Engineering.
Robert Matheson, Ph.D., Professor of Economic Entomology and Entomologist in the Experiment Station.

*On leave first term.

Leonard Amby Maynard, Ph.D., Professor of Animal Nutrition and Animal Nutritionist in the Experiment Station.
Albert Miller, M.S., Assistant in Parasitology.
John Ivan Miller, M.S. in Ed., Assistant in Animal Husbandry and Assistant in Animal Husbandry in the Experiment Station.
Frank Barron Morrison, B.S., Professor of Animal Husbandry and Animal Nutrition and Animal Husbandman and Animal Nutritionist in the Experiment Station.
Walter Conrad Muenscher, Ph.D., Assistant Professor of Botany and Weed Specialist in the Experiment Station.
James George Needham, Ph.D., Litt. D., D.Sc., Professor of Entomology and Limnology and Entomologist in the Experiment Station.
Edward Marshall Palmquist, M.S., Instructor in Botany.
Loren Clifford Petry, Ph.D., Professor of Botany.*
James Dunbar Pond, M.F., Instructor in Forestry (second term).
Philip Culloden Reece, M.A., Assistant in Botany.
Juan Estevan Reyna, E.E., M.A., Assistant Professor of Drawing.
Howard Wait Riley, M.E., Professor of Agricultural Engineering and Agricultural Engineer in the Experiment Station.
Arthur Thomas Ringrose, B.S., Instructor in Poultry Husbandry and Assistant in Poultry Husbandry in the Experiment Station.
Glenn Wade Salisbury, Ph.D., Instructor in Animal Husbandry and Assistant in Animal Husbandry in the Experiment Station.
William Dunlap Sargent, M.S., Instructor in Limnology.
Newell Allen Schappelle, Ph.D., Assistant in Botany.
Robert S. Snell, M.S., Assistant in Botany.
Clifford Nicks Stark, Ph.D., Professor of Bacteriology and Bacteriologist in the Experiment Station.
Mrs. Pauline Whitson Stark, M.S., Instructor in Bacteriology and Assistant in Bacteriology in the Experiment Station.
Karl McKay Wiegand, Ph.D., Professor of Botany.
Albert Hazen Wright, Ph.D., Professor of Zoology.
Forrest Blythe Wright, Ph.D., Assistant Professor of Agricultural Engineering.

The New York State Department of Conservation cooperates in the courses offered through lectures given by the following members of its staff:

William C. Adams, Ph.B., LL.B., Director of the Division of Fish and Game.
Nelson Gardiner Bump, M.S., Superintendent of Game.
Sumner M. Cowden, Superintendent of Fish Culture.
Robert Wesley Darrow, B.S., Game Research Investigator.
Frank Custer Edminster, M.S., Game Research Investigator.
John Greeley, Ph.D., Ichthyologist.
C. Willard Greene, Ph.D., Aquatic Biologist.
Earl Holm, Game Farm Foreman.
Emmett K. LeDune, D.V.M., Game Pathologist.
Emmeline Moore, Ph.D., Chief Aquatic Biologist.
John Victor Skiff, B.S., Field Agent, Bureau of Game.

*On leave first term.

WILD-LIFE CONSERVATION AND MANAGEMENT

The rapid extinction of many species of animals over large parts of their former ranges, noticeable especially during the past twenty-five years, shows the need of constructive measures of conservation. At first it was thought that the enforcement of appropriate laws would maintain desirable species in sufficient numbers for the demands of science and recreation, but it has become apparent that the biological problems involved are altogether too complex to be solved without detailed scientific investigations in which the facts and principles of many of the biological sciences must be utilized. This scientific basis for conservation has been growing, methods of artificial propagation formerly thought impossible have been perfected, and intricate problems of adjustment between species and their habitats have been elucidated until what is almost a new science has developed.

In organizing curricula for prospective workers in wild-life conservation and management, the attempt has been made to give the student not only a knowledge of present-day procedures but also a good background of training in the various sciences in which the basic facts and principles have been developed. Workers in conservation must cross the boundary lines of the conventionally organized biological sciences, and progress will be made by those who are themselves broadly trained and who can cooperate with specialists in the contributing fields. It is for this reason also that some of the instruction is given cooperatively by members of the staff of the University.

While not heretofore definitely organized as a curriculum in conservation, most of the courses have long been available at Cornell University, and much of the pioneer research has been done at this institution. The out-of-doors, field phases, of biological work, always strongly emphasized at Cornell, are especially needed in the training of those interested in the conservation and management of wild life. The location of the University is favorable to this type of work. Within easy reach is a varied environment of lakes, streams, and marshes, as well as of wooded uplands, agricultural fields, and submarginal farm land. The State parks, the game refuges, the wild-life sanctuaries, the University forest, the fish hatcheries, and the State game farms are readily accessible.

REQUIREMENTS FOR ADMISSION AND GRADUATION

The course in Wild-Life Conservation and Management is in the New York State College of Agriculture. Students taking this course are registered under the same conditions as are all other students in that College, and applicants for admission must therefore be familiar with the official announcement of courses of the College of Agriculture

which gives the requirements in detail. Briefly stated, the requirements for entrance include the following units: English, 3; foreign language, 3 (or two in each of two languages); history, 1; algebra, 1; plane geometry, 1; elective, 6. Holders of the New York State Diploma in Vocational Agriculture are also admitted, provided they present algebra 1 unit and geometry 1 unit. From among applicants meeting these requirements the College selects those who give the greatest promise of success in college work.

For graduation, four years of college work, or 122 credit hours, are required. Twenty-nine of these hours are more or less closely specified, 18 are elective in certain basic sciences, 55 others must be in subjects taught by members of the staff of the College of Agriculture, and the remaining 20 may be elected anywhere in the University. In addition, a candidate for a degree must take the prescribed work in Military Science and Physical Training. *(See the General Information Number.)*

Students in the College of Agriculture must meet a farm-practice requirement of three full-summers work if the experience has not been gained before admission. For students specializing in wild-life conservation, positions on game farms, refuges, in fish hatcheries, on fish or game surveys, as camp or park naturalists, as assistants on national or state forests, or as museum assistants, will be acceptable toward this requirement. While it cannot guarantee employment, the College will aid students in finding such positions. By cooperation of the New York State Department of Conservation a practice course in game farming will be arranged at the New York State Experimental Game Farm at Delmar, New York, for those specializing in game-bird propagation or in game management.

The tuition charge in the College of Agriculture is $200 a year except for those who are, and have been, for at least one year before admission, residents of the State of New York. For other details regarding expenses, reference should be made to the *Announcement of the College of Agriculture and the General Information Number.*

THE CURRICULA

The prospective student of wild-life conservation should give careful consideration to the kind of training that his own interest and his resources may make possible. If he desires to make his college training broader than his professional interests, or if he aims at the higher and more technical phases of the work, more than four years will obviously be needed.

The curricula listed fulfill the general requirements for graduation, but they should be regarded only as a suggestion of merely minimum technical preparation for various phases of wild-life conservation.

The divisions of the field of wild-life conservation and management as at present recognized by the College are the following:

I. Ornithology
II. Game-Bird Propagation
III. Game Management
IV. Economic Zoology and Animal Ecology
V. Fisheries

The suggested program of the first two years is virtually the same for each of these five divisions.

SUGGESTED CURRICULUM FOR THE FIRST TWO YEARS IN ALL FIVE DIVISIONS

FIRST YEAR

First term	*Hours credit*	*Second term*	*Hours credit*
English 1	3	English 1	3
Chemistry 101	3	Animal Physiology 10	3
Chemistry 105	3	Mechanical Drawing 1*	3
Wild-Life Conservation 1	2	Zoology 9 (Ornithology)	3
Zoology 1	3	Zoology 1	3
Hygiene 1	1	Hygiene 2	1
Orientation	1	Drill	
Drill			
	16		16

SECOND YEAR

Entomology 73 (Aquiculture)	3	Botany 1	3
Botany 1	3	Economics 1	5
Geology 100	3	Entomology 74 (Fish Culture)	2
Entomology 12	3	Zoology 8	3
Zoology 8	3	Elective	3
Drill		Drill	
	15		16

I. ORNITHOLOGY

Instruction in ornithology prepares students for positions in museums, biological surveys, conservation departments, state and national parks, private and public sanctuaries and refuges, or in academic work.

First and second years as on page 7.

*In the curricula in Game-Bird Propagation and in Fisheries, Chemistry 201 may be substituted.

THIRD YEAR

First term	*Hours credit*
Zoology 126 (Ornithology)	3
Botany 13 (Trees and Shrubs)	3
Bacteriology 43	2
Bacteriology 43a	2
Zoology 110 (Economic)	1
Forestry 23 (Silviculture)	3
Elective	1
	15

Second term	*Hours credit*
Agricultural Engineering 21 (Farm Engineering)	3
Wild-Life Conservation 2 (Game Management)	3
Forestry 54 (Forest Mensuration and Management)	3
Elective	6
	15

FOURTH YEAR

Zoology 131 (Ornithology)	3
Plant Breeding 101 (Genetics)	4
Zoology 11 (Comparative Anatomy of Vertebrates)	3
Agronomy 1 (Soils)	5
	15

Botany 117 (Taxonomy)	4
Zoology 11 (Comparative Anatomy of Vertebrates)	3
Forestry 106 (Forestry and Wild Life)	2
Entomology 75 (Fisheries Management)	1
Elective	5
	15

II. Game-Bird Propagation

Instruction in game-bird propagation trains men for positions on state and commercial game farms and on private preserves and estates. The development of artificial methods for the large-scale production of game birds has opened up new opportunities requiring technically trained men who can handle both artificial game propagation and game management on the land.

Students specializing in this division will devote the summer between the third and fourth years to the course in Game-Bird Propagation given at the State Game Farm at Delmar.

First and second years as on page 7.

THIRD YEAR

First term	*Hours credit*
Botany 13	3
Bacteriology 1	6
Chemistry 375 (Organic)	6
	15

Second term	*Hours credit*
Poultry Husbandry 110 (Nutrition)	3
Poultry Husbandry 30 (Incubation)	2
Agricultural Engineering 1 (Farm Mechanics)	3
Wild-Life Conservation 2 (Game Management)	3
Bacteriology 49 (Pathogenic Bacteriology)	2
Elective	2
	15

FOURTH YEAR

Plant Breeding 101 (Genetics)	4	Botany 117 (Taxonomy)	4
Forestry 1 (Farm Woodlot)	3	Forestry 106 (Forestry and Wild Life)	2
Poultry Husbandry 170 (Diseases)	2	Poultry Husbandry 120 (Genetics)	3
Animal Husbandry 110 (Nutrition)	3	Elective	6
Elective	3		
	15		15

III. Game Management

Instruction in Game Management prepares students in the management of land for the natural production of crops of game birds and game mammals. Positions requiring this training may be in conservation departments, biological surveys, national and state forestry services, state and national parks, private and public preserves, refuges, and sanctuaries, soil-erosion service, or in the academic field.

First and second years as on page 7.

THIRD YEAR

First term	*Hours credit*	*Second term*	*Hours credit*
Botany 13 (Trees and Shrubs)	3	Poultry Husbandry 110 (Nutrition)	3
Bacteriology 43	2	Poultry Husbandry 30 (Incubation)	2
Bacteriology 43a	2	Agricultural Engineering 1 (Farm Mechanics)	3
Zoology 110 (Economic)	1	Wild-Life Conservation 2 (Game Management)	3
Forestry 23 (Silviculture)	3	Forestry 54 (Forest Mensuration and Management)	3
Elective	4		
	15		14

In the summer following the third year the student is enrolled in a ten weeks' practice course in game-bird propagation at the Delmar State Game Farm.

FOURTH YEAR

Zoology 131 (Ornithology)	3	Botany 117 (Taxonomy)	4
Plant Breeding 101 (Genetics)	4	Forestry 106 (Forestry and Wild Life)	2
Zoology 11	3	Zoology 11	3
Poultry Husbandry 170 (Diseases)	2	Entomology 75 (Fisheries Management)	1
Agronomy 1 (Soils)	5	Elective	5
	17		15

IV. Economic Zoology and Ecology

Instruction in Economic Zoology and Ecology prepares students for biological and ecological surveys, for museum and explorational

work, and for carrying on economic field and laboratory research on mammals, amphibia, reptiles, and fish.

First and second years as on page 7.

For elective work in the third and fourth year, the following courses are suggested for consideration:

Animal Husbandry 110 (Nutrition)
Botany 13 (Trees and Shrubs)
Botany 15 (Weed Identification and Control)
Botany 117 (Taxonomy)
Entomology 51 (Parasites and Parasitism)
Entomology 71 (Limnology)
Engineering 21 (Farm Engineering)
Forestry 106 (Forestry and Wild Life)
Plant Breeding 101 (Genetics)
Animal Husbandry 30 (Health and Disease)
Zoology 11 (Comparative Entomology Vertebrates)
Zoology 22 (Ichthyology)
Zoology 23 and 24 (Herpetology)
Zoology 25 (Mammalogy)
Zoology 110 (Economic)
Zoology 300a (Vertebrate Taxonomy)
Zoology 112 (Literature of Economic Zoology)

V. Fisheries

The courses in Fisheries are designed to train students for positions in fish culture, management of lakes and streams, including biological surveys, and for the investigation of problems in these fields.

Opportunities for work may be found with various government agencies such as state conservation departments, fisheries bureaus, park and forest services, submarginal-land projects, and with the owners of private fishing preserves and commercial fish farms.

First and second years as on page 7.

THIRD YEAR

First term	*Hours credit*	*Second term*	*Hours credit*
Bacteriology 43	2	Animal Husbandry 10 (Livestock Feeding)	4
Bacteriology 43a	2	Wild-Life Conservation 2 (Game Management)	3
Entomology 71 (Limnology)	3	Entomology 75 (Fisheries Management)	1
Zoology 110 (Economic)	1	Elective	7
Elective	7		15
	15		

FOURTH YEAR

Plant Breeding 101 (Genetics)	4	Elective	15
Entomology 51 (Parasites and Parasitism)	2		
Animal Husbandry 110 (Nutrition)	3		
Elective	6		
	15		

For the elective work, attention is called to the following possibilities:

Pathogenic Bacteriology 49
Pathogenic Bacteriology 49a
Animal Husbandry 111 (Nutrition)
Entomology 300a (Research in Limnology)
Entomology 300g (Research in Aquiculture)
Zoology 22 (Ichthyology)
Zoology 112 (Literature of Economic Zoology)
Forestry 1 (Farm Woodlot)
Forestry 3 (Conservation of Natural Resources)
Forestry 23 (Silviculture)
Forestry 54 (Forest Mensuration and Management)
Physics 3 and 4
Solid Geometry 1
Plane Trigonometry 3
Agricultural Engineering 1 (Farm Mechanics)
Agricultural Engineering 21 (Farm Engineering)
Agricultural Engineering 24 (Farm Concrete)
Mechanical Drawing 1

DESCRIPTION OF COURSES

All courses in the curricula outlined or recommended for election are described on pages 11 to 20.

AGRICULTURAL ENGINEERING

1. **Farm Mechanics.** First or second term. Credit three hours. Prerequisite, reasonable proficiency in drawing; Drawing 1 recommended. Lectures: first term, T Th 9, Dairy Building 218; second term, T Th 10, Dairy Building 119. Practice: first term, M T or W 1.40–4; second term, M or T 1.40–4. Agricultural Engineering Laboratories. Professor RILEY and Assistant Professor WRIGHT.

A course planned to give training in understanding the farm application of mechanical methods and appliances and to develop ability to think and reason in terms of these. Laboratory fee, $2.

21. **Farm Engineering.** First or second term. Credit three hours. It is recommended but not required that students have training in mechanical drawing. Lectures: first term, M W 9; second term, M W 10. Dairy Building 119. Practice, M or T 1.40–4. Dairy Building, Fourth Floor, and field. Professor MCCURDY.

A study of the practical solution of the elementary problems involved in connection with surveying and mapping the farm; leveling for farm drainage and water supply; laying out building foundations. Farm drainage, concrete, and sewage disposal are studied. Laboratory fee, $2.

24. **Farm Concrete.** First term. Credit two hours. Lecture, T 11. Dairy Building 119. Practice, Th or F 1.40–4. Agricultural Engineering Laboratories. Professor MCCURDY.

A study of the selection, testing, and proportioning of the materials used in making concrete; building forms; mixing, placing, finishing, and curing concrete; waterproofing; inspection of local sand and gravel banks and of some local concrete structures. Laboratory fee, $1.

AGRONOMY

1. **The Nature and Properties of Soils.** First or second term. Credit five hours. Prerequisite, Chemistry 101 and 105 and Geology 100. Lectures, M W F 9. Caldwell 100. One laboratory period. Caldwell 49. Two recitations. Caldwell 31. Professor BUCKMAN.

A comprehensive course dealing with the composition, properties, and plant relations of soils, with particular reference to the use of lime, fertilizers, and other means of maintaining soil fertility. Laboratory fee, $3.

ANIMAL HUSBANDRY

10. **Livestock Feeding.** Second term. Credit four hours. Must be preceded or accompanied by Chemistry 101 and 105. Lectures, M W F 9. Animal Husbandry Building A. Laboratory, M 1.40–4, T 1.40–4, W 1.40–4, Th 1.40–4, or F 1.40–4. Professor MORRISON, Dr. SALISBURY, and Mr. MILLER.

The feeding of farm animals, including the general basic principles, feeding standards, the computation of rations, and the composition and nutritive value of livestock feeds.

110. **Animal Nutrition.** First term. Credit three hours. For advanced and graduate students. Prerequisite, course 10, Home Economics 122, or Poultry Husbandry 110; a course in human or veterinary physiology, and a course in organic chemistry. Lectures, M W F 10. Animal Husbandry Building B. Professor MAYNARD.

The chemistry and physiology of nutrition and the nutritive requirements for growth, reproduction, lactation, and other body functions.

111. **Animal Nutrition, Laboratory Course.** First term. Credit two or three hours. Must be preceded or accompanied by course 110. Registration by permission. M W F 1.40–4. Animal Nutrition Laboratory, Dairy Building. Professor MCCAY.

This course is designed to familiarize the student with the application of chemical methods to the solution of fundamental problems of nutrition. Laboratory fee, $5; breakage deposit, $5.

30. **Health and Diseases of Animals.** First term. Credit three hours. Not open to freshmen or to those who have had no courses in animal husbandry. Lectures, M W F 11. Veterinary College. Professor BIRCH.

The course is designed to give the student a clear conception of the causes and nature of the diseases of animals, with suggestions for their prevention. Special attention is given to the methods of preventing the spread of the infectious and epizootic diseases. Such information as is practicable is given for the treatment of slight injuries and for first aid in emergencies.

BACTERIOLOGY

1. **General Bacteriology.** First term. Credit six hours. Prerequisite, Chemistry 101. Lectures, recitations, and laboratory practice, M W F 1.40–5. Dairy Building 119 and 301. Professor STARK and Mrs. STARK.

An introductory course; a general survey of the field of bacteriology, with the fundamentals essential to further work in the subject. Laboratory fee, $15.

43. **General Bacteriology.** First term. Credit two hours. Lectures and recitations, M W 8. Dr. HAGAN.

43a. **General Bacteriology Laboratory.** First term. Credit two hours. Open to students who have taken or are taking course 43 or its equivalent. Section I, M Th 10–12.30. Section II, T 10–12.30; F 8–10.30. Laboratory fee, $10. Drs. ZEISSIG and BRUNER.

49. **Pathogenic Bacteriology.** Second term. Credit two hours. Prerequisite, course 43, or its equivalent. T Th 8. Dr. HAGAN.

49a. **Pathogenic Bacteriology Laboratory.** Second term. Credit three hours. M W F 10–12.30. Laboratory fee, $10. Dr. ZEISSIG.

BOTANY

1. **General Botany.** Throughout the year. Credit three hours a term; both terms of the course must be completed to obtain credit, unless the student is

excused by the department. If taken after Biology 1, credit two hours a term. Lectures, first term, in three sections: T Th 9 or 11, Mr. PALMQUIST, W F 11, or Dr. LAUBENGAYER; second term, in two sections: T Th 9 or 11, Professor PETRY. Plant Science 233. Laboratory, one period of two and one-half hours. Plant Science 240, 242, and 262. Professor PETRY, Doctors LAUBENGAYER and SCHAPPELLE, Messrs. PALMQUIST, SNELL, and REECE, and others.

A survey of the fundamental facts and principles of plant life. The work of the first term deals with the structures and functions of the higher plants, with special emphasis on their nutrition. The work of the second term traces the evolution of the plant kingdom, as illustrated by representatives of the principal groups, and concludes with a brief introduction to the principles of classification of the flowering plants. Laboratory fee, $3.50 a term.

13. **Trees and Shrubs.** First term. Credit three hours. Prerequisite, course 1 or its equivalent. Lecture, T 8. Plant Science 143. Laboratory or field work, M W or T Th 1.40–4. One all-day field trip is required. Plant Science 211. Assistant Professor MUENSCHER and Mr. CLAUSEN.

The identification of trees and shrubs in summer and in winter conditions. During the first part of the term the work covering identification is done largely in the field. The work of the latter part of the term is a study of the taxonomy of woody plants. For all students wishing a detailed knowledge of trees and shrubs. Laboratory fee, $3; deposit $5.

15. **Weed Identification and Control, Seed Analysis.** First term. Credit three hours. Prerequisite, course 1 or its equivalent. Lecture, Th 9. Plant Science 141. Laboratory, T Th 1.40–4. Plant Science 353. Assistant Professor MUENSCHER and ————.

Designed primarily for students of agriculture, especially those preparing for work in agricultural extension, crop production, and farm management; adapted also for students of nature study, civic improvement, conservation of game birds, and related fields.

A study of the characteristics of weeds, their sources, methods of reproduction, dissemination, and migration. Consideration of the losses due to weeds, and of control. Practice in making purity tests in analyses of seeds. Laboratory fee, $3; deposit, $5.

117. **Taxonomy of Higher Plants.** Second term. Credit four hours. Prerequisite, course 1 or its equivalent. Lecture, M 9. Laboratory M W F 1.40–4. Plant Science 211. Professor WIEGAND.

A study of the kinds of seed plants and ferns, their classification into genera, families, and orders, and field work on the local flora. Emphasis is placed on wild plants, but the more common cultivated plants receive some attention. The course is planned to follow course 1 and to furnish an introduction to the knowledge of field botany and classification of the higher plants, in preparation for special work in various departments, and as an aid in teaching. Instruction is given in the preparation of an herbarium and of keys. Laboratory fee, $4; deposit, $5.

Students completing this course may arrange, under course 145, to pursue special advanced work in taxonomy.

CHEMISTRY

101. **General Chemistry.** First or second term. Credit three hours. Lectures: two sections, M W F 11 or T Th S 11. Baker, Main Lecture Room. Professor BROWNE and Assistant Professor LAUBENGAYER.

105. **General Chemistry.** First or second term. Credit three hours. Recitation, one hour a week, to be arranged. Laboratory sections: M F 1.40–4; T Th 1.40–4; W 1.40–4; S 8–10.30. Baker 150. Assistant Professor LAUBENGAYER and assistants.

Chemistry 101 and 105 must be taken simultaneously, unless permission is obtained by the student from the Dean of his College and from the Department of Chemistry to take either course alone.

201. **Introductory Analytical Chemistry.** Repeated in the second term. Credit four hours. Prerequisite, Chemistry 101 and 105. Limited to students majoring in the biological sciences. Assistant Professor NICHOLS, Dr. MORSE, and assistants. Lectures: T Th 10; Baker 177.

Laboratory sections: W F 1.40–4; S 8–1.

A study of the fundamental principles of qualitative and quantitative analysis. Laboratory practice in gravimetric and volumetric quantitative methods.

375. **Elementary Organic Chemistry.** First term. Lectures and laboratory, six hours credit. For students preparing for the study of medicine. Prerequisite, Chemistry 101, 105, 205, and 206 (or 210). Lectures and written reviews, M W F S 9. Baker 207. Laboratory sections: M W 10–12.30; M W 1.40–4, Baker 250. Conference, M 10, M 1.40. Baker 207. T Th 1.40–4. Baker 250. Conference, T 1.40. Baker 207. Dr. CONNOR and assistants. Deposit, $20.

DRAWING

1. **Mechanical Drawing.** First or second term. Credit three hours. Lectures during laboratory periods. Laboratory: section 1, W F 1.40–4, or section 2, Th 1.40–4 and S 10.30–12.50. Two additional practice periods to be arranged to suit the schedule of the student. Dairy Building, Fourth Floor. Students must apply at the time of registration regarding materials required. Assistant Professor REYNA.

A course dealing with the principles and practices involved in the art of conveying information by graphical methods. The work includes use of instruments; lettering; orthographic projection involving plans, elevations, and sections; isometric drawing; and the practical applications of these principles to simple problems. This course may well be taken early by students interested in agricultural engineering. Laboratory fee, 50 cents.

ECONOMICS

1. **Modern Economic Society.** First or second term. Credit five hours. Daily except S 8, 9, 10, 11, 12. Assistant Professor O'LEARY.

Students should register, if possible, on the first day of registration. Section assignments are made at Goldwin Smith 260 on registration days. In the first term the registration is limited in number.

A survey of the existing economic order, its more salient and basic characteristics, and its operation.

ENGLISH

1. **Elementary Composition and Literature.** First and second terms. Credit three hours a term. M W F 8, 9, 10, 11, 12, and T Th S 8, 9, 10, 11. Rooms to be announced. Messrs. BALDWIN, ADAMS, FINCH, GIDDINGS, HARRIS, LIPA, MYERS, TRACY, and WILSON.

Open to underclassmen who have satisfied the entrance requirements in English. Students who have not taken the course in the first term may enter in the second term.

A study of composition in connection with the reading of representative works in English literature.

Students who elect English 1 must apply for assignment to sections: first term, September 23, 24, or 25 at the Drill Hall; second term, February 7 at Roberts 292.

ENTOMOLOGY

12. **General Entomology.** First term. Credit three hours. Prerequisite, Biology 1, Zoology 1, or Botany 1. Lectures, W F 9. Comstock 245. Professor MATHESON. Practical exercises, T W Th or F 1.40–4, or S 8–10.30. Comstock 200. Professor MATHESON and Messrs. BRODY and ALBERT MILLER.

Lectures on the characteristics of orders, suborders, and the more important families, and on the habits of representative species; practical exercises in studying the structure of insects and their classification. Laboratory fee, $2.50.

51. **Parasites and Parasitism.** Second term. Credit two hours. Prerequisite, Biology 1 or Zoology 1. Lecture, T 9. Comstock 245. Practical exercises, M or T 1.40–4. Comstock 200. Professor MATHESON and Messrs. BRODY and MILLER.

A consideration of the origin and biological significance of parasitism, and of the structure, life, and economic relations of representative parasites. Laboratory fee, $2.

[71. **General Limnology.** First term. Credit three hours. Alternates with course 70. Open to students who have taken or are taking courses 1 and 12, or the equivalent. Professor NEEDHAM and Mr. SARGENT.] Not given in 1935–36.

An introduction to the study of the life of inland waters. Aquatic organisms in their qualitative, quantitative, seasonal, and ecological relations. Laboratory fee, $2.50.

73. **Aquiculture.** First term. Credit three hours. Prerequisite, Biology 1 or Zoology 1. Lectures, M W F 12. Comstock 145. Professor EMBODY.

An exposition of the basic principles and cultural methods for propagating useful aquatic organisms, with special reference to fishes. The lectures cover such subjects as migration, spawning habits, natural and artificial foods, growth, assessment of age; cultural procedure for trout, bass, and other American fishes; European carp culture; commercial propagation of goldfish; financial aspects of fish culture; and the work of governmental agencies in conserving our fishery resources.

74. **Fish Culture.** Second term. Credit two hours. Must be preceded by course 73. T Th 1.40–4. Fish Hatchery and Comstock 110. Professor EMBODY.

A laboratory and field course, designed to give practice in hatchery methods, pond management, the study of natural conditions suitable for the maintenance of fish life, the evaluation of streams and lakes, and stocking procedure. An all-day excursion to one of the state fish hatcheries is required. The expense for this trip should not exceed $10. Laboratory fee, $7.

75. **Fisheries Management.** Second term. Credit one hour. Lecture, W 12. Comstock 145. Professor EMBODY, Director ADAMS, Drs. MOORE, GREEN, and GREELEY, and Mr. COWDEN.

A course dealing with the management of streams and lakes from the angler's point of view. The lectures treat of such subjects as physical, chemical, biological, and other factors influencing the production of food and game fishes, surveys, stream and lake-improvement methods, restocking, fishways, regulatory laws, and the establishment and functions of Conservation Departments.

300a. **Insect Ecology and Limnology.** Professors NEEDHAM and CLAASSEN.

300g. **Aquiculture.** Professor EMBODY. Laboratory fee, $2.50 an hour.

FORESTRY

1. **The Farm Woodlot.** First or second term. Credit three hours. First term: lectures, W F 11, Fernow 126; practice, M 1.40–4, Fernow 206. Professor GUISE. Second term: lectures, T Th 11, Fernow 122; practice, W 1.40–4, Fernow 206. Mr. POND.

A course covering those phases of forestry that are applicable to the farm woodlot. Identification of the principal trees of this region; measurement of logs, trees, and stands; nursery work, forest planting, thinning, and improvement cuttings; the preservation treatment of farm timbers. Laboratory fee, $1.

3. **Conservation of Natural Resources.** Second term. Credit two hours. Primarily for others than students of professional forestry. Prerequisite, Economics 1. Lectures, T Th 10. Fernow 122. Professor ADAMS.

The conservation of natural resources in the United States; the interrelation of the uses and wastes of the forest with those of various resources; the influence of the physical equipment of America on human life and on American civilization, with special reference to natural resources, as the basis of national strength.

[23. **Silviculture.** First term. Credit three hours. Professor GUISE.] Not given in 1935–36.

Distribution and importance of the principal timber trees and forest types of the United States; life history of the forest; silvicultural handling of woodlands, including natural reproduction of forests; forest planting, seeding, and nursery work, care of forest during its development, thinnings, and other intermediate cuttings; protection from fire and other enemies. Laboratory fee, $1.

54. **Forest Mensuration and Management.** Second term. Credit three hours. Lectures, M W 9. Fernow 126. Laboratory, T 1.40–4. Fernow 206. Professor GUISE.

Forest trees and types of Northeastern United States; instruments used in forestry; measurement of logs, trees, and stands of timber; volume increment; value determination; methods of determining cutting budgets; forest-management plans. Laboratory fee, $1.

[106. **Wild-Life Conservation in Relation to Forestry.** Second term. Credit two hours. Prerequisite, Game Management 2. Professor HOSMER.] Not given in 1935–36.

A consideration of the place of wild-life conservation and management in the multiple-purpose programs which govern the full and rounded use of national, state, and private forests.

GEOLOGY

100. **Introductory Geology.** First or second term. Credit three hours. Lectures, T Th 9. Sibley Dome. Laboratory, M T W Th or F 1.40–4, or S 8 if necessary. McGraw. Students must register for laboratory assignment at geology laboratory, McGraw, before the beginning of the course. Professor RIES, Assistant Professor BURFOOT, and Drs. MEGATHLIN and CONANT.

This course is planned to give beginners the fundamental principles of this branch of science. The inorganic aspects of the subject are emphasized more than are the organic.

HYGIENE

1. **Hygiene.** First term. Credit one hour. One lecture-recitation each week, with preliminary and final examination. The use of a textbook is required.

Sections for men: Assistant Professors GOULD, SHOWACRE, and YORK, and Drs. HAWKINS, ROBINSON, and TEAGARDEN.

Sections for women: Assistant Professor EVANS and Drs. CUYKENDALL and STELLE.

Students must report for registration and assignment to sections, the men at the Old Armory, the women at Sage Gymnasium.

2. **Hygiene.** Second term. Credit one hour. One lecture-recitation each week, with preliminary and final examination. The use of a textbook is required.

Sections for men: Assistant Professors GOULD, SHOWACRE, and YORK, and Drs. HAWKINS, ROBINSON, and TEAGARDEN.

Sections for women: Assistant Professor EVANS and Drs. CUYKENDALL and STELLE.

Students must report for registration and assignment to sections, the men at the Old Armory, the women at Sage Gymnasium.

MATHEMATICS

1. **Solid Geometry.** First or second term. Credit three hours. First term, M W F 8, T Th S 10; second term, M W F 10, T Th S 8.

3. **Plane Trigonometry.** First or second term. Credit three hours. First term, M W F 10, T Th S 8; second term, M W F 8, T Th S 10.

MILITARY SCIENCE AND TACTICS

1. **Practical and Theoretical Training.** Throughout the year. Every able-bodied male student (unless an alien), a candidate for a baccalaureate degree, who

is required to take five, six, seven, eight, or more terms in residence (or the equivalent in scholastic hours), must take, in addition to the scholastic requirements for the degree, one, two, three, or four terms, respectively, in the Department of Military Science and Tactics. Three hours a week, M T W or Th 1.40–4.10 p.m. New York State Drill Hall.

The requirements in Military Science and Tactics must be completed in the first terms of residence; otherwise the student will not be permitted to register again in the University without the consent of the University Faculty.

The course of training is that prescribed by the War Department as basic for Infantry and Field Artillery Branches of the Reserve Officers' Training Corps. The Infantry includes instruction in military courtesy, command and leadership, physical training, ceremonies, rifle marksmanship, automatic rifle, musketry, scouting and patrolling, machine guns, and the National Defense Act. The Field Artillery includes instruction in organization of the battery, customs of the service, military courtesy and discipline, dismounted drill, drill of the gun squad including service of the piece, gunner's examination, hippology, equitation and horsemanship, physical training, and topography.

2. **Elective Military Training.** Throughout the year. Credit two hours a term. Hours by assignment. New York State Drill Hall.

This is the advanced course prescribed by the War Department for units of the Reserve Officers' Training Corps, and includes five hours of practical and theoretical instruction a week, and in addition, the attendance at one summer-camp training period of six weeks duration. Normally this training is given in the summer following the completion of the first year of the advanced course. Those students who intend to accept a commission in the Officers' Reserve Corps upon the completion of the advanced course training, are certified as eligible to receive commutation of subsistence from the United States Government for the duration of their participation in the course.

Course 2 may be elected only by permission of the Director of Resident Instruction in the College and of the Professor of Military Science and Tactics. Credit is counted in the twenty elective hours allowed outside the College of Agriculture.

ORIENTATION

Orientation. First term. Credit one hour. Required of all freshmen in Agriculture. T Th 10. Roberts 131.

A course designed to orient students in the life of the University.

PHYSICS

3. **Introductory Physics.** First term. Credit three hours. Demonstration lectures, W F 9 or 11. Rockefeller A. One conference hour by arrangement. Assistant Professor HOWE. One laboratory period a week, to be arranged. Rockefeller 220. Messrs. MANN, MESCHTER, MYERS, and WEEKES.

A first course in Physics. Open only to students who do not offer Physics for entrance. Properties of matter, sound, and light.

4. **Introductory Physics.** Second term. Credit three hours. A continuation of course 3 and should be preceded by it. Hours and staff as in course 3.

Electricity, magnetism, and heat.

7. **Introductory Physics.** First term. Credit three hours. Lectures and laboratory as in course 3, at the same hours, and with the same staff. The conference hour is not included.

Open only to students who have offered Physics for entrance. Properties of matter, sound, and light.

8. **Introductory Physics.** Second term. Credit three hours. A continuation of course 7. Hours and staff as in course 7.

Open only to students who have offered Physics for entrance. Electricity, magnetism, and heat.

PHYSIOLOGY

10. **Animal Physiology.** First or second term. Credit three hours. A course of lectures and demonstrations arranged especially for students in Agriculture, but open to others. Students taking this course should be familiar with the first principles of chemistry. Permission to register is not required. First term, M W F 9; second term, M W F 10. Professor HAYDEN or Professor DUKES.

PLANT BREEDING

101. **Genetics.** First term. Credit four hours. Prerequisite, a beginning biological science and a course in physiology. Courses in cytology and in taxonomic botany and zoology will be found helpful. Lectures, M W F 8. Plant Science 143. One conference period, to be arranged. Laboratory, M T W or F 1.40–4. Plant Science 146. Professor FRASER and Dr. DORSEY.

A general introductory course designed to acquaint the student with the fundamental principles of heredity and variation. Special attention is given to the Mendelian interpretations of the facts of inheritance.

Laboratory studies of variation, and of the laws of heredity as illustrated by hybrid material in plants and by breeding experiments with the vinegar fly, Drosophila. Laboratory fee, $3; deposit, $2.

POULTRY HUSBANDRY

110. **Poultry Nutrition.** Second term. Credit three hours. Not open to freshmen. Lectures, T Th 9. Laboratory, Th 1.40–4. Poultry Building 300. Professor HEUSER and Mr. RINGROSE.

The principles of poultry nutrition and their application to poultry-feeding management.

120. **Poultry Genetics.** Second term. Credit three hours. Given in alternate years. Prerequisite, course 20 and Plant Breeding 101 or the equivalents. Open to graduate students and juniors and seniors. M W F 11. Poultry Building 300. Professor HUTT and Assistant Professor HALL.

Inheritance in domestic birds, the application of genetic principles to poultry breeding, disease resistance, hybrid vigor, cytology, physiology of avian reproduction, fertility, embryonic mortality, sex and secondary sex characters.

30. **Poultry Incubation and Brooding.** Second term. Credit two hours. Lecture, Th 11. Laboratory, F 1.40–4. Poultry Building 300. Mr. LAMOREUX.

Principles and practice of incubation and brooding and problems of hatchery management.

170. **Poultry Hygiene and Disease.** First term. Credit two hours. Prerequisite, courses 30 and 110, Animal Physiology 10, or Human Physiology 303, and Agricultural Bacteriology 3. Lectures, T Th 10. James Law Hall. Assistant Professor BRUNETT.

The course deals with the nature of the infectious and parasitic diseases of poultry and with the principles of hygiene applicable to poultry farming for the prevention and control of diseases.

WILD-LIFE CONSERVATION AND GAME FARMING

1. **The Conservation of Wild Life.** First term. Credit two hours. Lectures, T Th 11. McGraw 5. Professors ALLEN, NEEDHAM, HOSMER, WIEGAND, ADAMS, WARREN, EMBODY, PALMER, A. H. WRIGHT, and CLAASSEN, and Assistant Professor YOUNG, Drs. SUTTON and HAMILTON, and Mr. KELLOGG.

An introduction to the wild-life resources of North America; the importance of the flora and fauna in our economic and cultural life; the history of its decimation, the present need for conservation, and the methods employed to reestablish the various species.

2. **Game Management.** Second term. Credit three hours. Prerequisite, Botany 13 and Ornithology 126 or 131. Lecture, Th 10. McGraw 5. Laboratory

and field work, S 8–1, and at least four all-day Saturday trips. McGraw, South Museum. Professor ALLEN and Messrs. BUMP, EDMINSTER, SKIFF, and DARROW.

The principles and practices of game management as applied to field, woodland, forest, and aquatic game. Consideration of the properties and measurement of game populations, of the factors controlling abundance, of management technic, and of developmental plans for individual species. Laboratory studies of game species, predators, cover maps, management plans, feeding devices, and so on. Field work includes demonstrations and practice in game surveys, research methods, and other game-management practices. Laboratory fee, $3.

3. **Game-Bird Propagation.** A practical course of ten weeks beginning on the Thursday following the close of the second-term examinations. Required in the summer following the junior year of students specializing in Game Management or in Game-Bird Propagation. Professor ————, Messrs. BUMP, HOLM, and LEDUNE.

The course is conducted at the New York State Experimental Game Farm at Delmar, New York. It includes practice in incubation, brooding, housing, sanitation, and feeding of pheasants, quail, ruffed grouse, and wild waterfowl. Each student will run one hatch of pheasant eggs, carrying the hatch through to at least six weeks of age.

Living accommodations will be furnished at the State Game Farm. A fee will be charged for maintenance and for required materials.

Students register for this course with Professor Heuser at the time of the second-term registration in February.

ZOOLOGY

1. **Introductory Zoology.** First and second terms. Credit three hours a term. Lectures: section 1, T Th 9; section 2, T Th 11. Goldwin Smith B. Laboratory, M T W Th or F 1.40–4, or S 8–10.20. McGraw 104. Forenoon laboratory sections may be organized if desirable. Registration with the department before instruction begins is necessary for the assignment of laboratory and lecture sections. Professor REED, Dr. MEKEEL, and Misses MCMULLEN and PHELPS.

A comprehensive view of the subject of animal biology including the principles of structural and functional organization in the body, the animal as a living organism, the origin and perfection of animal types, together with a consideration of zoological generalizations and the application of biological principles to man. Fee, $3 a term.

8. **Elementary Taxonomy and Natural History of Vertebrates.** First and second terms. Credit three hours a term. Lecture, M 8. Laboratory, M W 1.40–4 or T Th 1.40–4. McGraw 7. Professor WRIGHT and Dr. HAMILTON.

Lectures on fishes, amphibians, reptiles, birds, and mammals, dealing with the principles of classification and nomenclature, characteristics, relationships, and bionomics of these groups. The laboratory gives practice in the identification of North American species. Field studies of the local fauna are undertaken during the fall and spring. Several all-day field trips are taken during the year. Laboratory fee, $4.50.

Students completing this course may arrange under course 300a to pursue advanced work in taxonomy of vertebrates.

9. **General Ornithology.** Second term. Credit three hours. Lecture, W 11. McGraw 5. Field work and laboratory, M W 1.40–4 or T Th 1.40–4. McGraw, South Museum. Professor ALLEN and Mr. KELLOGG.

Introduction to the study of birds, particularly the local species; their songs and habits; designed to give a working knowledge to those wishing to study birds as an avocation, and fundamental to those planning advanced work in ornithology. Laboratory work with bird skins is based on the field work. Laboratory fee, $3.

Students completing this course may arrange, under course 300b, to pursue advanced work during their junior and senior years.

11. **Comparative Anatomy of Vertebrates.** Throughout the year. Credit three hours a term. Prerequisite Zoology 1. Lecture, Section I, M 8, Section II,

M 10. McGraw 203. Laboratory, W F 8–10.30; M F 1.40–4; T Th 8–10.20; T Th 1.40–4; W 1.40–4; S 8–10.20. McGraw 201. Dr. SENNING and assistants.

A thorough dissection and study of representative vertebrate types. The lectures are arranged to correlate and supplement the studies made in the laboratory.

[22. **Ichthyology, Advanced Systematic and Field Zoology.** Throughout the year. Credit three hours a term. Professor WRIGHT and Dr. HAMILTON.] Not given in 1935–36.

An amplification of the prerequisite course 8. In the lectures, special emphasis is laid on the principal phases of animal life; the taxonomy, origin, and evolution of fossil and living groups; geographical distribution; and the literature and institutions of zoology. Laboratory periods are devoted to the identification of exotic and indigenous forms. Laboratory fee, $3.

23. **Herpetology (Amphibia).** First term. Credit three hours. Lectures, T Th 8. McGraw 7. Laboratory, F 1.40–4 or S 8–10.30. Professor WRIGHT and Dr. HAMILTON.

Laboratory fee, $3.

24. **Herpetology (Reptilia).** Second term. Credit three hours. Lectures, T Th 8. McGraw 7. Laboratory, F 1.40–4 or S 8–10.30. Professor WRIGHT and Dr. HAMILTON.

Laboratory fee, $3.

[25. **Mammalogy.** Throughout the year. Credit three hours a term. Professor WRIGHT and Dr. HAMILTON.] Not given in 1935–36.

Laboratory fee, $3.

110. **Economic Zoology.** First term. Credit one hour. Open to qualified upperclassmen and graduate students. Lecture, W 10. Several field trips to be arranged. Entomology 145. Dr. HAMILTON.

This course is designed to meet the needs of the teacher, agriculturist, extension worker, and professional zoologist. Among the topics treated are: control of injurious mammals, fur-farming, economics of the raw fur crop, game mammals, and a consideration of the laws and their effectiveness in various States.

112. **Literature of Economic Zoology, Conservation, and Ecology.** First or second term. Credit one hour. Th 7.30 p.m. McGraw 7. Professor WRIGHT, Dr. HAMILTON, and others.

The literature of economic zoology, ecology, limnology, oceanography, and kindred fields; fish and fisheries (for profit and pleasure); amphibians and reptiles, their uses; small and big game (commercial and sport); aquaria; zoological gardens; preserves; game farms; animals in relation to recreation, settlement, forestry, agriculture, and other industries; biologic resources, their exploration, conservation, utilization, and management.

126. **Advanced Ornithology.** First term. Credit three hours. Prerequisite, course 8 or 9. Lecture, W 11. McGraw 5. Field work and laboratory, T Th 1.40–4. Professor ALLEN and Mr. KELLOGG.

The structure and classification of birds; geographical distribution; the literature and institutions of ornithology; identification of representative birds of the world. The first part of the term is devoted to field work on the fall migration, and the identification of birds in winter plumage. Designed primarily for students specializing in ornithology or animal biology. Laboratory fee, $3.

[131. **Applied Ornithology.** First term. Credit three hours. Should be preceded by course 8 or 9, and presupposes an elementary knowledge of botany and entomology. Professor ALLEN and Mr. KELLOGG.] Not given in 1935–36.

This course is intended primarily for students planning to teach biological science or to engage in professional work in ornithology. Field collecting, preparation of specimens, and natural-history photography are emphasized, together with the food and feeding habits of birds; game management; classroom, museum, and Biological Survey methods. Laboratory fee, $3.

300a. **Research in Vertebrate Taxonomy and Natural History.**